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ASTM F2374-2000: Standard Practice for Design, Manufacture, Operation, and Maintenance of Inflatable Amusement Devices as required by:
State of Pennsylvania, 7 PAC 139.41
State of Michigan, MAC R 408.802 Rule 3

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Standard Practice for Design, Manufacture, Operation, and Maintenance of Inflatable Amusement Devices[1]

This standard is issued under the fixed designation F 2374; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice applies to the design, manufacture, and operation of inflatable amusement devices and their associated operating environments.

1.2 This practice specifically excludes inflatable devices that are used for professional exhibition or stunt work; safety and rescue activities; aerial or aviation structures or devices; exhibit floats; or similar inflatable devices.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

F 698 Specification for Physical Information to be Provided for Amusement Rides and Devices

F 747 Terminology Relating to Amusement Rides and Devices

F 770 Practice for Operation Procedures for Amusement Rides and Devices

F 853 Practice for Maintenance Procedures for Amusement Rides and Devices

F 893 Guide for Inspection of Amusement Rides and Devices

F 1159 Practice for Design and Manufacture of Patron Directed, Artificial Climbing Walls, Dry Slide, Coin Operated and Purposeful Water Immersion Amusement Rides and Devices and Air-Supported Structures

F 1193 Practice for Amusement Ride and Device Manufacturer Quality Assurance Program and Manufacturing Requirements

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *inflatable amusement device, n*—an amusement ride or device, as defined by Terminology F 747, consisting of air-filled structures designed for use, as specified by the manufacturer, that may include but not be limited to bounce, climb, slide, or interactive play. They are made of flexible fabric, kept inflated by continuous air flow by one or more blowers, and rely upon air pressure to maintain their shape.

3.1.1.1 *Discussion*—This definition specifically excludes similar inflatable devices that are used for professional exhibition or stunt work, safety, and rescue activities, aerial or aviation structures or devices, exhibit floats, or similar inflatable devices.

3.1.2 *owner/operator, n*—the person or organization having overall control and responsibility for the maintenance, setup, and operation of the inflatable device.

3.1.3 *operator/attendant, n*—the person who has been properly trained and designated by the owner to direct the operation of the inflatable device.

3.1.4 *user, n*—a participant in the use of the inflatable device as defined by the manufacturer.

4. Significance and Use

4.1 The purpose of this practice is to delineate information regarding the design, manufacture, installation, operation, and maintenance of inflatable amusement devices.

5. Inflatable Amusement Device Design and Manufacture

5.1 Inflatable amusement device manufacturers shall identify the specified use of each inflatable device to the owner prior to or at the time of sale.

5.2 Inflatable amusement device manufacturers shall provide specifications, setup, maintenance, and repair instructions to the original purchaser in accordance with Specification F 698, Practice F 853, and Guide F 893 and shall include, but may not be limited to, the following topics:

5.2.1 Signage, setup, takedown, and storage specifications and procedures.

5.2.2 Inflation pressure(s).

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[1] This practice is under the jurisdiction of ASTM Committee F24 on Amusement Rides and Devices and is the direct responsibility of Subcommittee F24.60 on Special Rides/Attractions.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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5.2.3 Specifications for number of blowers and required rated capacity.

5.2.4 Requirements for environmental conditions that include, but are not limited to, location, surface material, and weather conditions.

5.2.5 Maximum capacity by weight or number of users.

5.2.6 Service and adjustment procedures for all components of the inflatable device.

5.2.7 Contact information to be used by the owner, operator, or attendant to secure maintenance or operating assistance from the manufacturer.

5.2.8 Daily, weekly, monthly or other periodic minimum service and component checklists.

5.2.9 User height, weight, age, and other physical requirements or restrictions.

5.2.10 The inappropriate attire worn by users.

5.2.11 The minimum number of operators and attendants for each inflatable amusement device to control ingress/egress and operations.

5.3 Inflatable devices shall be designed and manufactured in accordance with Practices F 1159 and F 1193, and shall include, but may not be limited to:

5.3.1 There shall be no sharp exterior or interior angles or edges, parts, or ancillary equipment accessible to users which will cause injury if contact is made with them.

5.3.2 There shall be no entrapment points.

5.3.3 The outside walls shall be designed to contain users when operated in accordance with manufacturer's specified use.

5.3.4 The design shall be sufficient to allow for evacuation in the event of deflation.

5.3.4.1 The design shall provide for when the inflation air supply is interrupted. Deflation shall be prevented or minimized by, but not limited to, the use of a non-return valve or flap fitted to the blower or inflatable device, and by placing the inflation tube to the lowest part of the structure.

5.4 Inflatable amusement devices shall be provided with an anchorage system to prevent unplanned displacement during operation.

5.4.1 The manufacturer shall specify the number and strength(s) of anchorage points, which adequately take into account calculations for likely or appropriate specified wind loading conditions or restrictions.

5.4.2 The manufacturer of inflatable amusement devices shall specify maximum wind speeds and the type of anchorage.

5.4.3 Anchoring systems for inflatable amusement devices shall be fixed stationary objects, installed or weighted in accordance with the manufacturers' recommendations.

5.4.4 Anchorage points installed near an entrance and exit of an inflatable amusement ride shall be connected in such a manner as to minimize the potential for tripping, abrasions, or other injuries.

5.5 Inflatable amusement devices shall be manufactured from flexible materials, which have tear and burst strength and sufficient air retention to perform according to ASTM specifications. The manufacturing criteria for inflatable amusement devices shall include, but may not be limited to the following:

5.5.1 Inflatable amusement devices shall be of a material that is flame-resistant in accordance with Practice F 1159 and meets local, state, or federal fire safety standards.

5.5.2 Where zips or zippers are used as emergency exits in inflatable amusement devices they shall be reliable, easy to use, and capable of being opened from both sides.

5.6 Blowers shall comply with Practice F 1159.

5.6.1 Blowers and inflation tubes shall be positioned so that they will not impede the ingress/egress of the device.

5.7 Inflatable amusement devices, which are designed and manufactured to be operated as totally enclosed structures without clear visibility of the surrounding exterior areas, shall provide exits that meet all local, state, or federal requirements as applicable to inflatable amusement devices or structures, or both.

6. Inflatable Amusement Device Operations

6.1 Inflatable amusement device owners and operators shall review the manufacturer's specifications, maintenance, and repair instructions in accordance with Specification F 698, Practice F 770, Practice F 853, and Guide F 893, and shall operate the inflatable device(s) in regard to the following topics which include, but may not be limited to:

6.1.1 Setup, takedown, and storage specifications and procedures.

6.1.2 Inflation pressure(s).

6.1.3 Specifications for number of blowers and required rated capacity.

6.1.4 Requirements for environmental conditions that include, but are not limited to, location, surface material, and weather conditions.

6.1.5 Maximum capacity by weight or number of users.

6.1.6 Service and adjustment procedures for all components of the inflatable device.

6.1.7 Daily, weekly, monthly, or other periodic minimum service and component checklists.

6.1.8 User height, weight, age, and other physical requirements or restrictions.

6.1.9 The inappropriate attire worn by users.

6.1.10 The minimum number of operator(s) and attendant(s) for each inflatable amusement device with controlled ingress/egress and use.

6.1.11 Inflatable amusement devices should not be used when the wind is in excess of the maximum wind speed specified by the manufacturer.

6.1.11.1 In the event that the manufacturer of the inflatable amusement device has not specified a maximum allowable wind speed for operations, the maximum wind speed for operations of inflatable amusement devices shall be 25 mph.

6.2 The operator of inflatable amusement devices shall operate the device away from hazards in accordance with Practice F 770.

6.3 The operator of an inflatable amusement device shall provide a protective ground cover for the inflatable device where appropriate in accordance with manufacturer's specifications.

6.3.1 The operator of an inflatable amusement device shall anchor and secure the device in accordance with the manufacturer's specifications and recommendations.

6.3.2 Operational automotive equipment or other transportation devices shall not be used as anchorage for inflatable amusement devices.

6.3.3 The operator of an inflatable amusement device shall provide appropriate barriers surrounding the device to manage crowds and in accordance with local, state, or federal laws.

6.3.4 Any landing surface surrounding an inflatable amusement device shall be covered by adequate landing material, including, but not limited to, gym mats or the equivalent material.

6.4 The operators of inflatable amusement devices shall provide the appropriate number of attendants, according to a minimum specified by the manufacturer, to effectively manage and monitor activities on the inflatable device during operations.

6.4.1 In deciding how many attendants are required, the operator shall consider factors including but not limited to the following:

6.4.1.1 The manufacturer's recommendations or requirements.

6.4.1.2 The number of users using the device.

6.4.1.3 The age of users using the device.

6.4.1.4 The environment in which the inflatable device is used.

6.5 The method of operation established by the owner/operator/renter shall verify that users are admitted to the inflatable device in a controlled manner, including, but not limited to, the following criteria:

6.5.1 Require that users remove inappropriate attire, including hard, sharp, or dangerous objects (such as buckles, pens, purses, badges, and so forth).

6.5.2 Users shall not be allowed to obstruct the entrance or exit of any inflatable device.

6.5.3 Users shall not be allowed to play on the step or front apron of an inflatable device.

6.5.4 Users shall not be allowed to climb or hang on the walls of an inflatable device unless the device is designed for that purpose.

6.5.5 Users shall be required to conform with or meet height, weight, or age restrictions to use or participate in the inflatable device activity or operations.

6.5.6 The entrance and exit shall be kept clear of onlookers or others so that the operator and attendant have a clear view and can verify that users are able to enter and exit safely.

6.5.7 No users shall be allowed on the inflatable device during inflation or deflation. Deflation shall be performed only when the inflatable device is not in operation.

6.5.8 Bodily contact, flips, or drop kicks by users shall not be allowed on an inflatable device per manufacturer's specifications.

6.6 The operator and attendants shall monitor activity on the inflatable devices at all times during operations.

6.6.1 Operators and attendants shall incorporate the use of whistles or other devices or signal equipment and take appropriate action at the first sign of misbehavior or violation of posted rules.

6.7 Operators and attendants shall verify that the inflatable device is not overloaded with users in accordance with manufacturer's specifications.

6.8 The owner of the inflatable device shall verify and document that operators receive training in accordance with Practice F 770.

6.9 Patron responsibility shall be in accordance with Practice F 770.

7. Inflatable Amusement Device Maintenance

7.1 Inflatable devices shall be maintained in accordance with manufacturer's recommendations, requirements, and instructions contained in the owner's operations manual.

7.2 Details of all maintenance work performed on the inflatable device shall be documented in accordance with Practice F 853.

7.3 Daily inspections shall be performed in accordance with the inflatable device manufacturer's recommendations and requirements and Practice F 853, including, but not limited to:

7.3.1 Inspection of the site condition to verify that it meets the manufacturer's recommendations.

7.3.2 Inspection to verify that appropriate crowd control measures and barriers are in place.

7.3.3 Anchoring systems are intact, and ropes are not worn or chafed.

7.3.4 Anchor systems secure the inflatable device.

7.3.5 There are no significant holes or rips in the fabric or seams.

7.3.6 The correct blower(s) specified for the device is being used and the air pressure is within the manufacturer's specification for operation.

7.3.7 There are no exposed electrical contacts.

7.3.7.1 The insulation on all of the electrical cables is in good condition.

7.3.7.2 Electrical plugs, sockets, and switches are not damaged and are properly grounded.

7.3.7.3 No utility lines are located within 20 ft of the device in all directions.

7.3.8 The bolts and screws of the blower are properly secured and appropriate guards are secured over the air inlet and outlet.

7.3.9 The blower inflation tube is in good condition and is firmly fixed to the blower.

7.3.10 The blower is positioned correctly, adequately protected or guarded and does not present a tripping hazard in accordance with Practice F 1159.

8. Keywords

8.1 anchoring systems; blowers; deflation; design; inflatable amusement devices; inflation tubes; maintenance; operation

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